

Fact Sheet

A MULTI-BAND, VARIABLE, HIGH-FREQUENCY ANTENNA

PROBLEM

Radio communications in the high-frequency (HF) band (3 to 30 MHz) frequently employ wire antennas, such as the half-wavelength dipole. One necessary criterion for an antenna to act as an efficient radiator of electromagnetic energy is an impedance match between the antenna and transmitter at the desired frequency of transmission. If this criterion is not met, then diminished quality of communications and damage to the transmitter may result.

HISTORY

For operation over a wide variety of frequencies there are several alternatives that can be employed to ensure efficient coupling of the antenna to the transmitter:

- An individual antenna for each desired operating frequency can be erected. However, this is often difficult and impractical, especially for field and emergency operations.
- A multi-band antenna can be used; however, these employ bulky resonant inductor-capacitor “traps” that allow an impedance match, typically for two or three widely separated narrow bands of frequency.
- An antenna tuner, inserted between the transmitter and antenna, can be used to match the impedances. The tuner is a separate piece of equipment, often as large as the transmitter, that requires some skill to operate.

SOLUTION

A multi-band, variable, high-frequency antenna (U.S. Patent # 5,706,018) has been developed that permits simple manual adjustment of the antenna length, facilitating efficient operation at any frequency within a broad range. The antenna elements consist of a coaxial arrangement of a flexible, tubular wire braid that can be manually contracted or extended over a synthetic support rope. The level of operator skill required is minimal because the antenna has an integral frequency adjustment scale marked on the support rope.

This invention has the following advantages:

- Simple and economical multi-frequency HF antenna.
- Antenna tunable to any frequency within designated range.
- Compactly stored and quickly deployable.
- Design concept applicable to a wide variety of wire antenna types, and to MF, HF, and VHF applications.

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